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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,596	05/06/2002	Carsten Knoeppel	225/50731	4257

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EXAMINER

BHATNAGAR, ANAND P

ART UNIT PAPER NUMBER

2623

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/009,596

Applicant(s)

KNOEPEL ET AL.

Examiner

Anand Bhatnagar

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 7-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/11/01.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).  
Misnumbered claims 10-21 been renumbered 7-18.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saneyoshi et al. (EP 0874 331 A2, will be further referred as San.) and Laumeyer et al. (U.S. patent pub. 2001/0036293 A1, will be further referred as Lau.).

Regarding claims 7 and 18: San. Discloses a method of detecting objects in a vicinity of a road vehicle up to a considerable distance, in which a distance from a moving or stationary vehicle to one or more objects calculated by

distance-based image segmentation using stereo image processing, and characteristics of the detected objects are determined by object recognition in the segmented image regions (San.; col. 1 lines 3-5 and col. 3 lines 1-23), the method comprising the acts of:

determining image regions of elevated objects (col. 4 lines 5-15 and col. 6 lines 52-56, wherein the vehicles are detected and the vehicles are read as elevated objects) and/or flat objects (col. 5 lines 20-26, wherein the lane markers are detected and the lane markers are read as flat objects);

detecting elevated objects and/or flat objects by combining points in accordance with predetermined criteria (San.; abstract and col. 3 lines 33-45), the elevated objects being determined through features with similar distance values (San.; col. 3 lines 33-45) and the flat objects being determined through features with similar height values (San.; col. 9 lines 3-33, wherein the lane markers/stains/shadow are detected as such depending if the height is 0.1 meters or less);

tracking over time relevant detected objects and determining the distance and lateral position of the relevant detected objects relative to the road vehicle in order to assess dynamic behavior of the relevant detected objects (San.; col. 6 lines 52-58 , wherein the vehicles to the left and right side of the main vehicle are detected and their speeds as well. The left and right sides are read as the lateral side.);

determining object hypothesis for performing object recognition, said object hypothesis being verified by comparison with object models (col. 5 lines 20-46, wherein the lane markers are detected. The parameters of the lane markers are changed in the model to agree with the road configuration, i.e. a hypothesis needs to be first made so that the parameters that need to be changed/chosen are done within a certain degree/error to match the road images).

scanning segmented image regions in accordance with predetermined, statistically verified 2D features of particular relevant detected objects to be recognized (San.; fig. 4 and 5, col. 7 lines 12-57, col. 8 lines 1-57, and col. 9 lines 1-34, wherein the blocks are compared and the distance values "2D features" are used to identify the objects in the images).

San. et al. discloses to detect the objects in a series of images by using determined distance values of the objects in the images. San. et al. does not teach the feature of "comparing the particular relevant detected objects using a neural network for classifying a specific object type." Lau. teaches to use neural network in order to identify objects in an image based on their shape as being small or large (Lau. paragraph 0053). One skilled in the art would have been to motivated to incorporate the teaching of Lau. into the system of San. because they are analogous in detecting objects in a video. One skilled in the art would have been motivated to incorporate the teaching using neural network of Lau., for object identification and classification, into the system of San. in order to

accurately recognizing, classifying, and locating each of a variety of objects of interest appearing in a videostream (Lau. paragraph 0007).

Regarding claim 8: The method according wherein elevated relevant detected objects are road vehicles and flat relevant detected objects are road markings and boundaries (San.; col. 9 lines 26-34 and fig. 7 wherein the lane markers and the right/left emergency lane line "boundaries" is detected).

Regarding claim 9: The method further comprising the act of determining a relative position and a relative speed of the relevant detected objects relative to one another and to the road vehicle by evaluating a distance measurement, in order to determine an accurate road-lane object association (San.; col. 6 lines 52-58, wherein the vehicle speeds and their respective lateral lanes are determined).

Regarding claim 10: The method wherein the relative position and the relative speed of the relevant detected objects are determined in order to assess a relevance of the detected objects to a particular situation (San.; col. 1 lines 6-15 and col. 6 lines 52-58, wherein the vehicle speeds and their respective lateral lanes are determined in order to detect a possible collision).

Regarding claim 11: The method further comprising the act of determining a relative position and a relative speed of the relevant detected objects relative to one another and to the road vehicle by evaluating a distance measurement, in order to determine an accurate road-lane object association (San.; col. 6 lines

52-58, wherein the vehicle speeds and their respective lateral lanes "relative positions" are determined).

Regarding claim 12: The method wherein the relative position and the relative speed of the relevant detected objects are determined in order to assess a relevance of the detected objects to a particular situation (San.; col. 1 lines 6-15 and col. 6 lines 52-58, wherein the vehicle speeds and their respective lateral lanes "relative position" are determined in order to detect a possible collision).

Regarding claims 13-15: The method further comprising the acts of:  
scanning one of recorded pairs of stereo images for significant features of objects to be registered (San.; col. 3 lines 23-45);

determining a spacing of the significant features by comparing respective features in a stereo image from a pair of stereo images with the same, corresponding features, in the other stereo image from the pair of stereo images recorded at the same time (San.; col. 3 lines 23-45); and

wherein disparities that occur are evaluated via cross correlation techniques (San.; col. 3 lines 23-45, wherein the deviation between the two images is determined, i.e. cross correlated).

Regarding claim 16: The method wherein by determining the spacing of the significant features in a pixel range, 3D points in the road vehicle environment are determined relative to a coordinate system of a measuring device performing the detecting method (San. col. 3 lines 1-6).

Regarding claim 17: The method according wherein said objects are detected by at least one of radar, infrared sensing, and stereoscopic or mono-sensing (San.; col. 3 lines 16-32).

### **Conclusion**

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Saneyoshi et al. (U.S. patent 5,410,346) for a road object identification system.

Hanawa (U.S. patent pub. 2003/0099377 A1) for a road object identification system.

### **Contact Information**

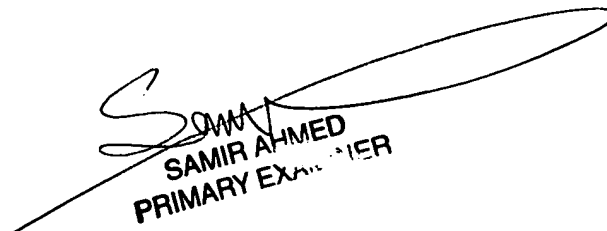
4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anand Bhatnagar whose telephone number is (571) 272-7416, whose supervisor is Jingge Wu whose number is (571) 272-7429, Central fax is 571-273-8300, and Tech center 2600 customer service office number is 703-306-0377.

AB

Anand Bhatnagar

Art Unit 2623

September 13, 2005

  
SAMIR AHMED  
PRIMARY EXAMINER